



Dust Control and Loading Systems Inc

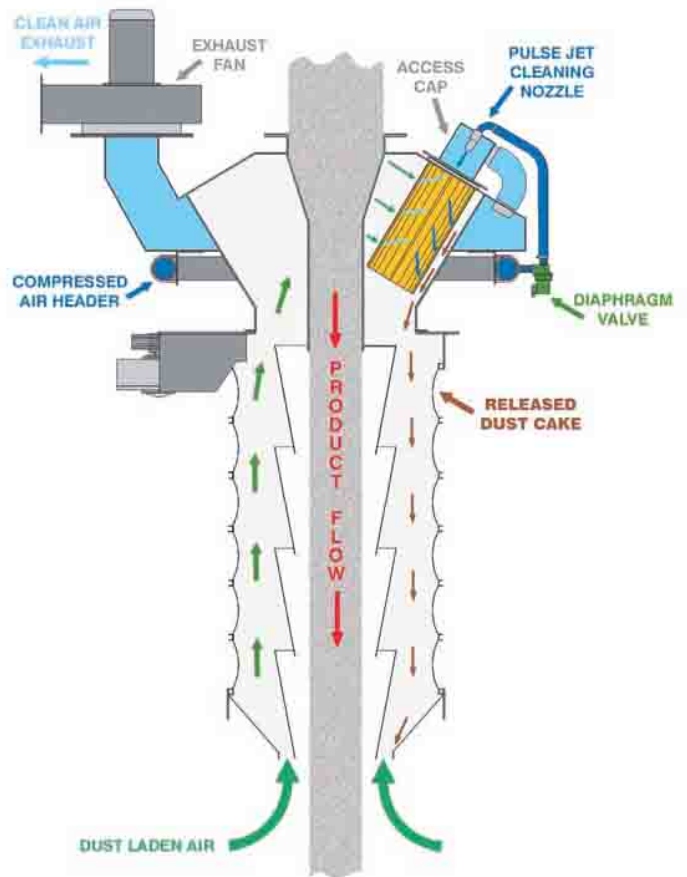
Leaders in Innovative Bulk Loading Systems Design

# Compact Filter Module

## APPLICATION

The Compact Filter Module is ideal for use inline at any bulk material transfer point requiring dust control. It's low profile configuration also makes the CFM the best choice for inline filtration when intergraded with a DCL Loading Spout. The flow tube can be eliminated making this unit suitable as a bin vent for any tight headroom conditions.

When used as an inline filter, product flows through a central flow tube while isolated from the upward dust entrained airflow. The collected dust is deposited back to the material being handled making the Compact Filter Module an ideal cost effective package especially when compared to a free standing dust collector utilizing duct work, discharge air lock, and often a means to convey the dust back to the system.



## FEATURES

The exhaust fan can be directly mounted to the assembly eliminating the need for a remote fan placement. The unique design provides internal velocities that are lower than what is normally expected from conventional designs resulting in less load on the filtration media. The filter elements are automatically cleaned during operation with a conventional 80 PSI pulse jet system. The unit can be provided with a final clean feature that is activated at the end of each loading cycle fully cleaning all elements, eliminating residuals.

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# Ventilation Module

## VENTILATION MODULE

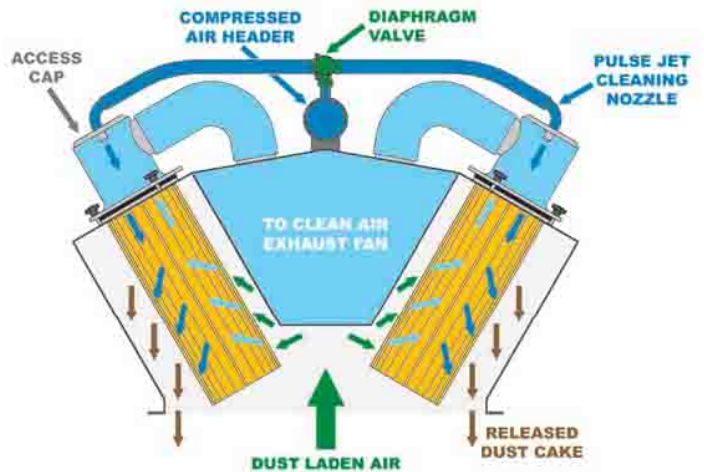
The Ventilation Module is an excellent choice for dust control when used directly at the source. This includes conveyor head chutes, ventilation of enclosed conveyors, screeners, mixers, silos, and batching bins. The special designed pleated filter elements are sized to be easily handled and are replaced without tools.

The dust that is collected by the VMV is deposited back to the material being handled. The Ventilation Module is an ideal cost effective package especially when compared to a free standing dust collector utilizing duct work, discharge air lock, and often a means to convey the dust back to the system.



## FEATURES

The exhaust fan, up to 6000 CFM is directly mounted to the assembly eliminating the need for a remote fan placement. The unique design provides internal velocities that are lower than what is normally expected from conventional designs resulting in less load on the filtration media. The filter elements are automatically cleaned during operation with a conventional 80-100 PSI pulse jet system. The unit can be provided with a final clean feature that is activated at the end of each loading cycle fully cleaning all elements, eliminating residuals.



Ventilation Modules can be designed for many applications.



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## Dust Collector & Bin Vent

### DC DUST COLLECTOR

Dust collectors are typically installed at a remote location with duct work feeding to it from multiple bulk material transfer points requiring dust control. Some of the dust collector options include; platforms, railing, ladders, multiple access ports and doors.

All dust collectors are offered in top and bottom filter removal designs as well as walk in clean air plenums. Exhaust fans can be mounted to the dust collector or next to it. A wide variety of filter media choices are available to suit most dry particle filtering requirements.



Dust collector with access platform and safety hand rail.

### FEATURES

DCL offers a large selection of dust collectors and bin vents with up to 3000 square feet of filter media. Exhaust fans can be sized up to 18000 CFM.

A choice of construction materials allow handling of all types of products; fine, granular, lumpy, abrasive, corrosive, and sanitary applications. A choice of electrical options are also available allowing for installation in almost any environment; NEMA 4, NEMA 4X, NEMA 7, NEMA 9, 120V/220V control, 460V/415V power, etc.

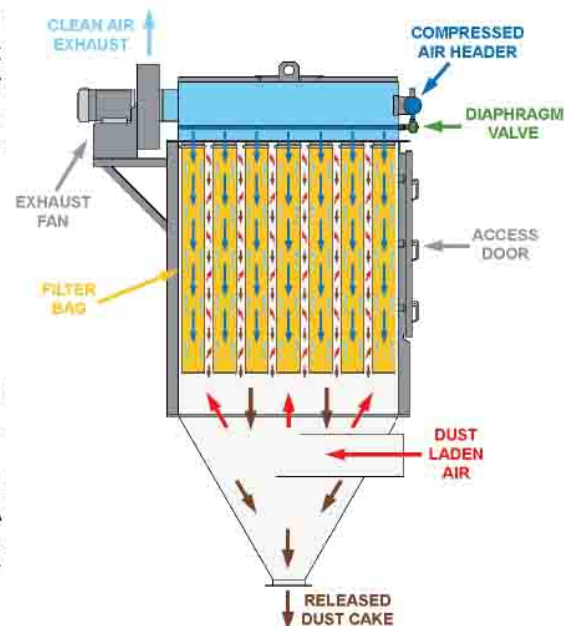


Bin vent with walk in clean air plenum.

### BV BIN VENT

Bin vents are similar in design to dust collectors, except they do not have a collection hopper mounted to the bottom of the unit. Bin vents are typically installed on top of storage silos. They are typically used to vent storage silos, but can also accept remote duct work. Some of the bin vent options include; platforms, railing, ladders, multiple access ports and doors.

All bin vents are offered in top and bottom filter removal designs as well as walk in clean air plenums. Exhaust fans can be mounted to the bin vent or next to it. A wide variety of filter media choices are available to suit most dry particle filtering requirements.



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## Bag Fill Station

### BAG FILL STATION

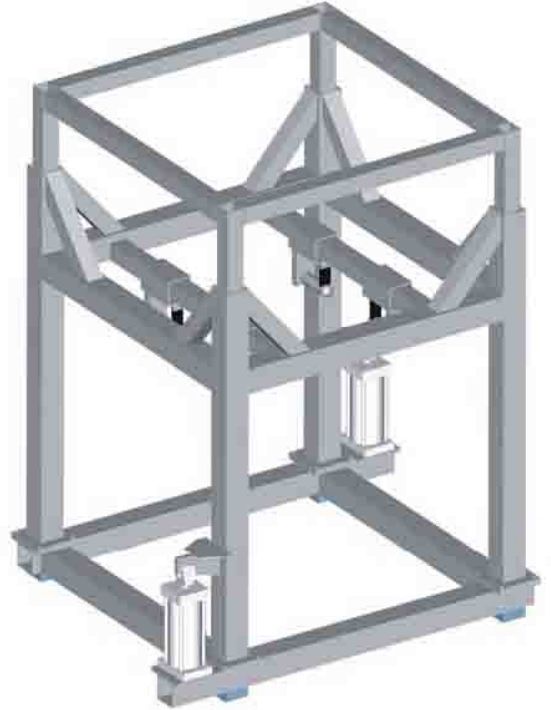
DCL's dust free bulk bag filling stations are provided in configurations tailored for a specific bag and are designed to accommodate a full range of bag sizes. The systems use high accuracy scales with manual sequence or PLC controls. The bag fill station comes in two typical designs, a two post and four post and four post.

A wide variety of options allow for manual or fully automatic operation. Bag filling options include; automatic strap release, powered and gravity, roller conveyors, empty pallet dispenser, full and dribble feed product flow control valve, drum and box filling adapters with simultaneous weighing and densifying and integral filters.



DCL offers a wide variety of bag fill stations that can handle bags from 25 to 60 cubic square feet.

A choice of construction materials allow handling of all types of products; fine, granular, lumpy, abrasive, corrosive, and sanitary applications. A choice of electrical options are also available allowing for installation in almost any environment; NEMA 4, NEMA 4X, NEMA 7, NEMA 9, 120V/220V control, 460V/415V power, etc.



### BAG FILL NECK

Bag filling necks are typically used in conjunction with a bag filling station. The bag is sealed around the bag filling neck and

the bladder on the BFN is then inflated allowing for a complete dust tight seal. The bag filling neck dust outlet must be ducted to a dust collector in order to pull the air and dust from the bag.

A choice of construction materials allow handling of all types of products; fine, granular, lumpy, abrasive, corrosive, and sanitary applications. A choice of electrical options are also available allowing for installation in almost any environment; NEMA 4, NEMA 4X, NEMA 7, NEMA 9, 120V/220V control, 460V/415V power, etc.



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# System Controls

## PUSH BUTTON CONTROL PANELS

Push button control panels from small two button spout control to sloped top enclosures for complete loadout system control. Push button pendants, wireless or conventional hard wired with 20' of SO cord.



## PLC CONTROL PANELS

PLC (Programmable Logic Control) panels sized to match the system providing less field wiring and improved maintenance and trouble shooting ability. VPN (Virtual Private Network) connection can be added to a PLC system to allow DCL to remotely access and troubleshoot, allowing DCL the ability to make PLC changes remotely and diagnose and possibly fix a problem without having to send a field technician.



## HUMAN MACHINE INTERFACE CONTROL

HMI (Human Machine Interface) provides all the function of conventional push button control plus allows for graphic viewing of the system in operation. Also provides greater alarm indication and data logging for scheduling preventive maintenance.



## CLOSED CIRCUIT CAMERA CONTROL

CCC (Closed Circuit Camera) system includes required camera(s) and viewing monitor to allow a truck driver to align their truck hatch with the loading spout as they drive into the loadout station.



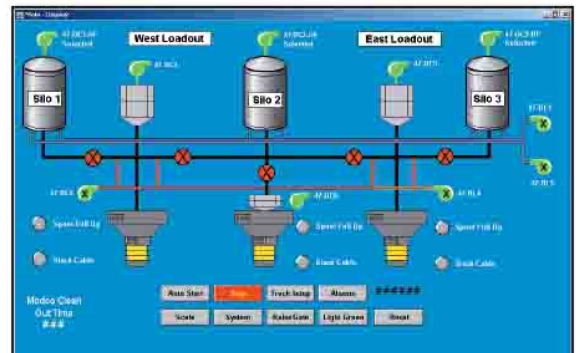
## MOTOR STARTER PANELS

Motor starter panels, either stand alone or incorporated with the push button control panel or PLC panel, providing motor control for all of the systems three phase motors.



## LOADOUT AUTOMATION

The SmartLoader vision system is at the center of our recommended plant loadout automation system design. The SmartLoader Vision is a PC based system which can be integrated with bucket elevators, silo volume, flow control, truck scales, and the plant billing system. This allows for a truck driver to never leave his truck and drive away with a receipt in hand.



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# SmartLoader Vision System

## OVERVIEW

DCL is proud to announce its fully automatic, unattended bulk loading station for high speed filling of dry, dusty materials into enclosed vehicles.

The SmartLoader utilizes a patented vision system that scans the top of the vehicle. Any open hatch or series of open hatches are automatically located, measured, and qualified. The multi-speed positioner provides a fast scanning speed to minimize loading cycle times.

A unique articulating positioning arm is used to move the loading spout within a designed loading area. Dual direction positioners can also be utilized to keep costs down when similar truck trailers are being used in the same load out station.

## SMARTLOADER VISION SYSTEM

Fully automatic, unattended loading is accomplished by using the SmartLoader Vision System. The development of this system represents the final link to truly automatic loading. The top of the truck is scanned as the truck enters the station. As the open hatch is detected, a traffic light signals the driver to stop. The vision system then takes the final hatch coordinates and adjusts the loading spout positioner centering the spout to the hatch. The spout is then lowered into the hatch once the scale has captured the vehicle tare weight. When the filling cycle is complete, the spout raises. The traffic signal and exit gate then allow the driver to exit the station.



Articulating arm positioning system.



Dual direction positioning system.

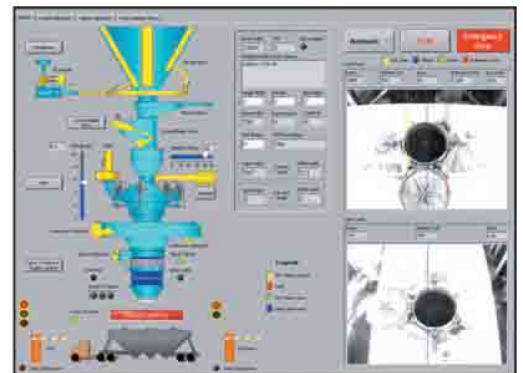
The Smart Loader Vision technology requires that the loading station be enclosed with no possibility of sunlight illuminating the vehicle either by direct sunlight or reflected sunlight. Past system performance has shown that the Vision system is capable of identifying 98 percent of hatches found on common bulk hauling trucks. Some error can be attributed to the driver's inability to understand the system operation. The user is responsible for notifying truck drivers of the new system operation, written driver instruction or instructional signs outside of the loading station. The system controls and operation scheme must accommodate manual intervention on occasion due to driver error or system malfunction. The manual operating scheme can include driver or plant personnel intervention.

The Loading Spout, Positioner and Vision System are shipped assembled in a steel cradle pre-wired to a positioner frame mounted control panel containing spout and positioner motor

controls and PLC. A single Ethernet connection is required from the equipment mounted control panel to the host control system in the control room.

Factory testing is conducted prior to shipping to check out all electrical components and to preset all limit switches. This procedure greatly reduces the amount of wiring and set up required in the field. Factory technicians need only deal with Vision calibration and handshake requirements with the host system.

For more detailed application information please see "Case History: Technology Breakthrough Fully Automated Loadout Terminal" DCL publication PUBc-0609-CH03.



PC display interface for dual direction positioning system utilizing SmartLoader Vision System.